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Research Article

**COMPARISON OF DRY EYE SYNDROME IN TYPE-II
DIABETICS WITH AND WITHOUT DIABETIC
RETINOPATHY**¹Dr. Manzoor Hussain Malik, ²Dr. Rehan Moinuddin Shaikh, ³Dr. Muhammad Khalid¹Consultant Ophthalmologist, Al-Shifa Hospital, Bahawalpur²Associated Professor, Pak Red Crescent Medical College, Lahore³Associate Professor, Department of Ophthalmology, Quaid-e-Azam Medical College,
Bahawalpur**Article Received:** November 2019 **Accepted:** December 2019 **Published:** January 2020**Abstract:****Objective:** To compare the dry eye syndrome in type-II diabetics with and without diabetic retinopathy.**Material and methods:** This cross sectional study was conducted at Department of Ophthalmology, Al-Shifa Hospital, Bahawalpur from March 2018 to September 2018 over the period of 6 months. Total 60 patients with diabetes mellitus (30 patients with retinopathy and 30 without retinopathy) having age ≥ 35 years either male or female attending OPD were selected for this study. Dry eye syndrome was compared between the two groups.**Results:** Total 60 diabetics were selected for this study. Mean age of the patients was 54.03 ± 7.89 with age range 35-76 years. Male patients were 26 (43.3%) and female patients were 34 (56.7%). Several symptoms of dry eye syndrome were noted in patients and scored according to the McMonnie's Dry Eye Questionnaire. The most common symptom reported was foreign body sensation (96.7%). Most of the symptoms of dry eye except itching was found significantly ($p < 0.005$) more common in patients with diabetic retinopathy as compared to patients without diabetic retinopathy.**Conclusion:** Dry eye syndrome must be diagnosed in diabetic patients. Periodic screening of diabetic patients should be carried out to evaluate diabetic retinopathy and its complications.**Keywords:** Dry eye syndrome, Diabetic retinopathy, Schirmer's BST, TBUT**Corresponding author:****Dr. Iqra javed,**PMDC # 99328-P., Email : star920@yahoo.com

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INTRODUCTION:

The International Diabetes Federation (IDF) estimates that the global diabetes epidemic continues increasing. According to the report of the IDF in 2013, China has the largest number of diabetics (98.4 million) and this number is now higher than in India (65.1 million) and in the USA (24.4 million).¹ While diabetic retinopathy (DR) and diabetic cataracts are well-known complications, dry eye syndrome (DES), also referred to as keratoconjunctivitis sicca, is also common in the diabetic population. Studies have indicated 54% prevalence of asymptomatic and symptomatic DES, in diabetes.² However, the relationship between diabetes and DES still remains unclear.

Diabetes mellitus (DM) has been identified as one of the leading systemic risk factors for DES. The reported prevalence of DES in diabetics is 15–33% in those over 65 years of age and increases with age and is 50% more common in women than in men.³ The incidence of dry eye is correlated with the level of glycated hemoglobin: the higher the level of glycated hemoglobin, the higher the incidence of dry eye.⁴

The Beaver Dam Eye Study reported that approximately 20% of dry eyes occurred in individuals with Type 2 diabetes aged between 43 and 86 years. Hom and De Land reported that 53% of patients with either diabetes or borderline diabetes had self-reported, clinically relevant dry eyes.⁵ In a hospital-based study, 54% of those with diabetes had DES and there was a significant correlation between DES and the duration of diabetes. This suggests that examination for dry eye should be an integral part of the ocular examination in patients with diabetes.²

Present study was done to assess dry eye syndrome in patients with and without diabetic retinopathy. We compared symptoms and signs of dry eye syndrome in patients with and without retinopathy. So that morbidity of dry eye may reduce.

MATERIAL AND METHODS:

This cross sectional study was conducted at Department of Ophthalmology, Al-Shifa Hospital, Bahawalpur from March 2018 to September 2018 over the period of 6 months. Total 60 patients with diabetes mellitus (30 patients with retinopathy and 30 without retinopathy) having age ≥ 35 years either male or female attending OPD were selected for this study. Exclusion criteria for the study were any patient on medication which affect dry eye condition, any eye lid disease or abnormality, any ocular surface disorder, vitamin A deficiency, contact lens users, history of LASIK surgery, habit

of smoking and eyes in which fundus examination was not possible.

Study was approved by the ethical committee and written informed consent was taken from every patient. For tear film evaluation, Tear film break up time (TBUT), Fluorescein staining and Schirmer basic secretion test (BST) were performed on patient as per standard guidelines.⁶

For statistical analysis, an average of values of two eyes was applied. TBUT of less than 10 seconds was considered abnormal. For BST, any value less than 10mm was taken as an indicator of dry eye.

Findings were entered in pre-designed proforma along with demographic profile of the patients.

All the collected data was analyzed by using SPSS version 18. Mean and SD was calculated for numerical data and frequencies were calculated for categorical data.

RESULTS:

Mean age of the patients was 54.03 ± 7.89 with age range 35-76 years. Male patients were 26 (43.3%) and female patients were 34 (56.7%). Out of 26 males, 11 (42.3%) had evidence of diabetic retinopathy while 15 (57.7%) had no evidence. Out of 34 females, 19 (58.9%) had diabetic retinopathy while 15 (41.1%) had no evidence of the same.

Several symptoms of dry eye syndrome were noted in patients and scored according to the McMonnie's Dry Eye Questionnaire. The most common symptom reported was foreign body sensation (96.7%). Most of the symptoms of dry eye except itching was found significantly ($p < 0.005$) more common in patients with diabetic retinopathy as compared to patients without diabetic retinopathy. (Table 1)

All Signs of dry eye disorder were found more commonly in patients with diabetic retinopathy as compared to those without diabetic retinopathy. Most common sign of dry eye was conjunctival vascular tortuosity (50%), found significantly more in patients with diabetic retinopathy as compared to patients without diabetic retinopathy. (Table 2)

Out of 60 patients studied, 17 (28.3%) were diagnosed as having dry eye based on Schirmer's BST and 40 (66.7%) with dry eye based on TBUT (< 10 seconds). Conjunctival Vascular Tortuosity was seen in 100% (17 out of 17) with dry eye diagnosed with Schirmer's BST and 70% (28 out of 40) with dry eye diagnosed by TBUT. (Table 3)

Out of 17 patients with a Schirmer's value <10mm, 14 (23.3%) had diabetic retinopathy while only 3 (5%) patients were without diabetic retinopathy. Patients with diabetic retinopathy had 7.87 times more chance of having Schirmer's value <10mm than those without diabetic retinopathy. Out of 40 patients with TBUT<10 seconds, 25 (41.7%) had diabetic retinopathy and 15 (25%) patients were without diabetic retinopathy. Patients with diabetic retinopathy had 5 times more chance of having TBUT<10 seconds than those without diabetic retinopathy.

A comparison of McMonnie's symptom score and Schirmer's test and TBUT was also done. It was observed that with increase in McMonnie's symptoms score, dry eye severity based on Schirmer's test and TBUT also increased and it was statistically significant ($p<0.05$) in both patients with and without diabetic retinopathy. McMonnie's scores correlates well with both Schirmer's test and TBUT. (Table 4)

Table 1: Symptoms of dry eye in patients with and without diabetic retinopathy.

Symptoms	Overall N (%)	With retinopathy N (%)	Without retinopathy N (%)	P value
Foreign body sensation	58 (96.7)	30 (50%)	28 (46.7)	0.149
Grittiness	41 (68.3)	28 (46.7)	13 (21.6)	<0.05
Burning sensation	27 (45.0)	19 (31.7)	8 (13.3)	<0.05
Itching	11 (18.3)	4 (6.7)	7 (11.6)	0.317
Dryness	45 (75.0)	27 (45.0)	18 (30.0)	<0.05
Effect of smoke, smog, ac etc.	13 (21.7)	9 (15.0)	4 (6.7)	0.116
Feeling dry after alcohol intake	2 (3.3)	1 (1.7)	1 (1.6)	1
Joint pain	3 (5.0)	2 (3.3)	1 (1.7)	0.555
Dryness of nose, mouth and throat	3 (5.0)	2 (3.3)	1 (1.7)	0.555
Thyroid abnormality	4 (6.7)	3 (5.0)	1 (1.7)	0.298
Sleep with eyes open	0 (0.0)	0 (0.0)	0 (0.0)	0
Eye irritation on walking	35 (58.3)	28 (46.7)	7 (11.6)	<0.05

Table 2: Clinical signs of dry eye in patients with and without diabetic retinopathy.

Signs	Overall N (%)	With retinopathy N (%)	Without retinopathy N (%)	P value
Conjunctival vascular tortuosity	30 (50.0)	22 (36.7)	8 (13.3)	<0.05
Normal corneal lusture decreased	17 (28.3)	15 (25.0)	2 (3.3)	<0.05
Fluorescein staining	9 (15.0)	7 (11.7)	2 (3.3)	0.070

Table 3: Clinical signs of dry eye in patients with Schirmer's <10mm and TBUT<10 secs.

Sign	Schirmer's <10mm N=17 (28.3%)	TBUT<10 secs N=40 (66.7%)
Conjunctival vascular tortuosity	17	28
Normal corneal lusture decreased	13	18
Fluorescein staining	6	9

Table 4: Abnormal Schirmer's test (<10mm) and abnormal TBUT (<10 secs) in patients with and without diabetic retinopathy.

Tests	Overall N (%)	With retinopathy N (%)	Without retinopathy N (%)	Odd ratio	95% CI	P value
Schirmer's <10mm	17 (28.3%)	14 (23.3)	3 (5.0)	7.87	1.95-31.67	<0.05
TBUT <10 secs	40 (66.7%)	25 (41.7)	15 (25.0)	5.00	1.50-16.56	<0.05

DISCUSSION:

Diabetes may lead to various ocular complications including dry eye syndrome or Keratoconjunctivitis Sicca (KCS). A study by Rahman et al showed that KCS is another manifestation of type 2 diabetes.⁷ The ocular surface disease in diabetes is characterized by disorder of tear films which can be confirmed by multiple tear film tests like Schierner's BST and TBUT.

The presence of various symptoms of dry eye syndrome was noted according to the McMonnie's Dry Eye Questionnaire. Foreign body sensation was most common symptom while itching was least reported in present study. Also, most of the symptoms were more common in patients with diabetic retinopathy as compared to ones without diabetic retinopathy. Khurana et al found that all symptoms of dry eye, except itching were found to be higher in patients with diabetic retinopathy as compared to patients without diabetic retinopathy.⁸ Patients with diabetic retinopathy were found to have more corneal vascular tortuosity and decreased corneal lustre as compared to patients without diabetic retinopathy. Meibomian gland dysfunction is found more in diabetic patients, also seen by Lin X et al.⁹

TBUT and Schirmer's BST values were lower in diabetic patients with diabetic retinopathy as compared to those without diabetic retinopathy. Dogru et al showed that diabetic patients with peripheral neuropathy and poor metabolic control have lower tear film tests values as compared to controls.¹⁰ Ozdemir et al reported that abnormality of tear film tests are significantly associated with severity of diabetic retinopathy.¹¹

Patients with diabetic retinopathy had a higher chance of having TBUT<10 seconds and Schirmers value<10mm than those without diabetic retinopathy. Dhar RH et al found that mean schirmer's value and mean TBUT in the patients with diabetic retinopathy was significantly lower as compared to those without diabetic retinopathy.¹² Limitations of the research work was the glycemic parameter assessment especially HBA1C and duration of diabetes was not included in the study. Sample size and duration of study was small in the study thus the study does not necessary represent the result for entire population.

CONCLUSION:

A detailed symptoms assessment by McMonnie's questionnaire can be done for dry eye screening of diabetic patients even in primary and secondary health care levels. Patients should be treated for these symptoms if they are affecting their day to day working. Tear film diagnostic tests like Schirmer's BST and TBUT should be considered for grading

severity and choosing proper treatment options. Dry eye syndrome was positively correlated with the presence of diabetic retinopathy in this study. Any diabetic patient complaining of dry eye symptoms should be screened for diabetic retinopathy.

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